

Application No. 10/604,606  
Responsive to the Final Office Action of May 3, 2005

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### **REMARKS**

Applicant thanks the Examiner for his thoughtful review of the present application. The status of the claims is as follows: **Claims 1 – 15 and Claims 19 – 25 are Pending; Claims 16 – 18 are Canceled; and Claims 26 – 30 are Withdrawn** as non-elected claims of Group II pursuant to a **Restriction Requirement** mailed on **05 January 2005**. Amendments to the claims are described below in the **PRESENT AMENDMENT**.

#### **i. PRESENT AMENDMENT**

Independent **Claim 1** was amended herein to particularly point out and distinctly claim the subject matter the Applicant regards as the invention. Specifically, the claim now recites that the method modifies electrical properties of a two-terminal memory element in a cross point memory array that is directly over active circuitry. The two-terminal memory element comprises a PCMO as a multi-resistive state material. Support for the amendment can at least be found in Paragraphs **0006 – 0008, 0027 – 0029, 0031 – 0032, 0036 – 0039, and 0050** of the **Detailed Description**, dependent **Claims 16, 17, and 18** as originally filed, and **FIGS. 1, 2, 3, 4, and 7** of the **Drawings**.

**Claims 6 – 7, 9 – 10, and 14 – 15** were amended to provide a proper antecedent basis for "an interface" and to replace "electrodes" with "pair of conductive array lines" so that the elements of those claims comport with **Claim 1** as amended herein.

**Claim 16 - 18** were **Canceled** because **Claim 1** now recites elements from those claims.

No new matter was introduced in amending the claims.

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ii. **ARGUMENT**

a. **Rejection of Claims 1 – 20 and 22 – 24 under 35 U.S.C. §102(b) or §103(a) (Watanabe reference)**

A prima facie case of anticipation under 35 U.S.C. §102(b) requires that each claim limitation be explicitly or inherently disclosed in the cited reference. *Watanabe* does not explicitly or inherently disclose each claim limitation as now recited in amended independent **Claim 1**.

First, the Applicant respectfully submits that on page 3740 of *Watanabe*, a PCMO perovskite material is not disclosed as the multi-resistive state material. Instead, all *Watanabe* discloses is that the research of others on crystalline materials (e.g. perovskites) gives some insights into the processes that lead to the complex behavior of the memory effect in the doped SrTiO<sub>3</sub> crystals that *Watanabe* discloses in his article. *Watanabe* only discloses a SrZrO<sub>3</sub>:Cr or SrTiO<sub>3</sub> film positioned between (Au/SrRuO<sub>3</sub>) or (Ti/Pt) electrodes. *Watanabe's* specific references to perovskites (see page 3740) does not include those containing praseodymium (Pr) and calcium (Ca), but rather only compositions of (La,Sr)MnO<sub>3</sub> are disclosed. Therefore, *Watanabe* does not explicitly or inherently disclose a doped PCMO for the multi-resistive state material.

Second, *Watanabe* does not explicitly or inherently disclose a two-terminal memory element in a cross-point memory array with the two-terminal memory element positioned between a pair of conductive array lines where the cross point array is positioned over a substrate including active circuitry and multiple layers of conductive paths. Simply put, all of the claim limitations in amended **Claim 1** are not disclosed in the cited sections of *Watanabe*. Although *Watanabe* does disclose "Materials showing reversible resistive switching are attractive for today's semiconductor technology with its wide interest in non-volatile random-access memories" (see the abstract on page 3738), that sentence does not explicitly or inherently disclose all of the elements as set forth in amended **Claim 1**. Specifically, there is no reason to believe *Watanabe* can be used directly on top of active circuitry in a cross point array. The undersigned knows of no

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commercial re-writable non-volatile RAM that uses a cross point array structure over active circuitry.

Therefore, **Claim 1** is not anticipated by *Watanabe* and the rejection of **Claim 1** under **35 U.S.C. §102(b)** ought to now be withdrawn. For at least the same reasons as argued above for independent **Claim 1**, **Claims 2 – 24** depend from **Claim 1** and inherent all of its limitations. Consequently, dependent **Claims 2 – 24** are not anticipated by *Watanabe* and the rejection of those claims under **35 U.S.C. §102(b)** ought to now be withdrawn.

A prima facie case of obviousness under **35 U.S.C. §103(a)** requires that all claim limitations be disclosed in the cited reference. For the same reasons as argued above under the **§102(b)** rejections, all of the claim limitations recited in amended **Claim 1** are not disclosed in *Watanabe*.

First, *Watanabe* is silent as to a doped PCMO for the multi-resistive state material and as argued above. *Watanabe's* references to perovskites (see page 3740) does not include perovskites containing praseodymium (Pr) and calcium (Ca). Therefore, *Watanabe* is silent as to the limitation of a multi-resistive state material comprising a PCMO.

Second, *Watanabe* is silent as to a two-terminal memory element positioned between a pair of conductive array lines in a cross point memory array over active circuitry.

Consequently, because *Watanabe* fails to disclose all of the claim limitations of independent **Claim 1** as amended herein, **Claim 1** is not prima facie obvious in view of *Watanabe* and the rejection of **Claim 1** under **35 U.S.C. §103(a)** ought to now be withdrawn. For at least the same reasons as argued above for independent **Claim 1**, **Claims 2 – 24** depend from **Claim 1** and inherent all of its limitations. Consequently, dependent **Claims 2 – 24** are not obvious in view of *Watanabe* and the rejection of those claims under **35 U.S.C. §103(a)** ought to now be withdrawn.

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**b. Rejection of Claims 21 and 25 under §103(a) (Watanabe & Beck references)**

**Claims 21 and 25** are not prima facie obvious under **§103(a)** in view of the cited sections of *Watanabe* or *Beck*, considered individually or in combination, for at least the same reasons as argued above in section (a) for independent **Claim 1**. In short, all of the claim limitations as now set forth in amended **Claim 1** are not disclosed, taught, or suggested in the cited sections of *Watanabe* and/or *Beck*.

First, the arguments applied to *Watanabe* above under **§103(a)** also apply to the combination of *Watanabe* and *Beck*, because *Beck* is also silent as to a doped multi-resistive state material comprising a PCMO positioned between a pair of conductive array lines. Although, *Beck* mentions perovskite (see abstract on page 139), *Beck* is silent as to PCMO and only discloses (Ba,Sr)TiO<sub>3</sub>, SrZrO<sub>3</sub>, SrTiO<sub>3</sub>, Ca<sub>2</sub>Nb<sub>2</sub>O<sub>7</sub>, and Ta<sub>2</sub>O<sub>5</sub> materials that are doped with Cr, Fe, or V (see page 139).

Second, although *Beck* discloses materials as candidates for nonvolatile memories and oxides (paragraph 1, page 138), oxides that can be used in DRAM or as gate insulators (see paragraph 1, page 138), ferroelectric materials (see paragraph 1, page 138), MIM structures (see paragraph 2, page 138), and simple capacitor-like structures to act as a nonvolatile random access memory (see paragraph 2, page 140), what *Beck* fails disclose is a two-terminal memory element in a cross point memory array formed over a substrate including active circuitry. Moreover, *Beck* is *silent* as to a doped multi-resistive state material comprising a PCMO.

Accordingly, **Claims 21 and 25** are not prima facie obvious in view of the cited sections of *Watanabe* and/or *Beck* and the rejections of **Claims 21 and 25** under **35 U.S.C. §103(a)** ought to now be withdrawn.

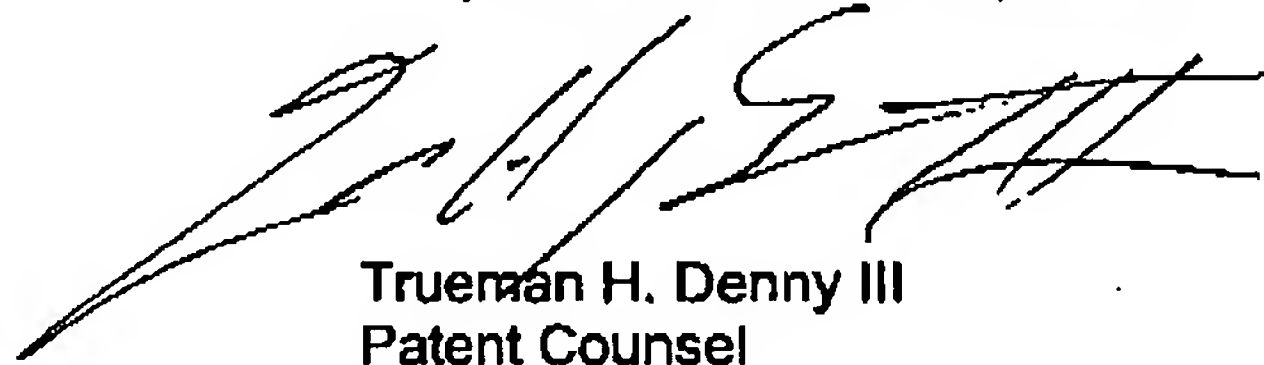
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III. **CONCLUSION**

Applicant now believes the present case to be in condition for allowance, and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application the undersigned can be reached at (408) 737-7200 x124.

Respectfully submitted,  
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